



## NASA Aeronautics Research Institute

Through aeronautical research solicitations and hosting future challenges, the NASA Aeronautics Research Institute (NARI) promotes innovation in aeronautics across a broad spectrum of aeronautical challenges in the nation's air transportation system. The institute coordinates those efforts, and communicates the outcome of the research conducted to interested parties both internal and external to NASA.

NARI, part of NASA's Aeronautics Research Mission Directorate (ARMD), was established to pursue ARMD's objective to make deliberate investments in innovative, early-stage, and potentially revolutionary aviation concepts and technologies. This reflects ARMD's desire to not only acquire additional innovative concepts within its technical portfolio, but also in the management of this portfolio. The institute's formulation and operating concept reflects a new approach for ARMD to introduce fresh lines of research into existing ARMD programs and projects. As a result, the NARI will complement other ARMD efforts in seeking early-stage innovative concepts.

### PORTFOLIO

#### Seedling Fund

The Seedling Fund annually provides NASA civil servants the opportunity to perform research, analysis, and proof-of-concept development of their novel ideas that have the potential to

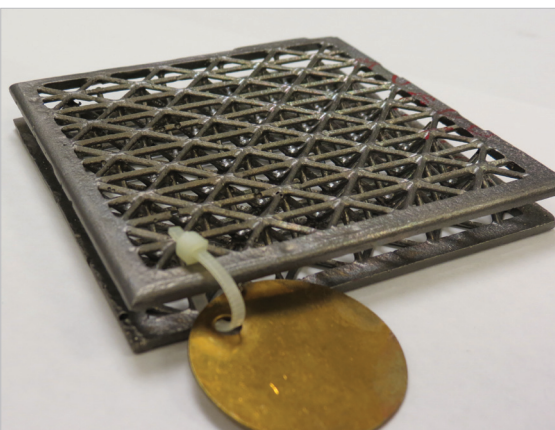
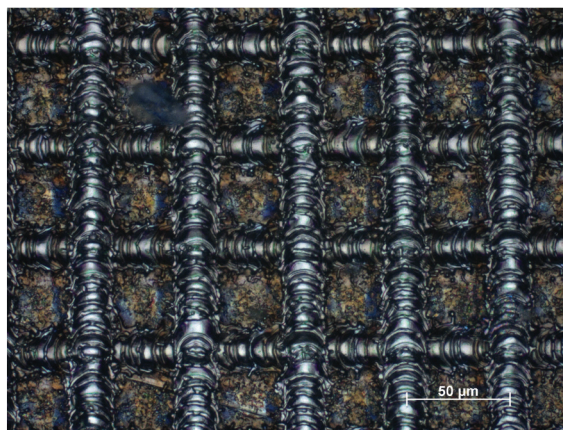
meet national aeronautics needs. Funding is provided for early-stage efforts not currently supported by ARMD programs and projects, with the goal of infusing promising concepts into the ARMD research portfolio or into NASA's Small Business Innovation Research program for further development.

Only NASA civil servants are eligible to lead the research team. Teaming is encouraged but at least half the award money should be used on civil servant labor. Phase I tasks of up to \$150,000 are funded for a period of performance of 12 months to explore the viability of the proposed concept and define major feasibility issues. Phase II tasks are funded up to \$400,000 for a 12-18 month period. Phase II awards are based on a down-select of Phase I efforts that have shown promising progress. NARI selects both Phase I and Phase II awards competitively based on a peer review by subject matter experts.

#### Leading Edge Aeronautics Research for NASA (LEARN) Fund

The LEARN Fund is complementary to the Seedling Fund and has similar goals, but it invests in innovative ideas from outside NASA. It is open to all domestic researchers, however, NASA civil servants are not permitted to propose research or lead a research team. LEARN solicitations will be announced annually through the NASA Solicita-

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These images are examples of mid-term results from 2011 Seedling Fund efforts. **(left)** This crosshatch laser-ablated pattern in titanium alloy results from a more environmentally friendly bonding technique for aircraft structures. The new process is being developed to replace the current practice of etching with hazardous chemicals to condition a surface for enhanced bond strength. **(right)** This titanium lattice block casting, extremely high strength yet lightweight, is a new structural concept with smart materials for aircraft.

tion and Proposal Integrated Review and Evaluation System, or NSPIRES. The ARMD investment in LEARN is comparable to the Seedling Fund, with Phase I awards of up to \$200,000 funded for a period of performance of 12 months; and Phase II tasks funded up to \$400,000 for a 12-18 month period.

### Challenges and Prizes

In the future, NARI will also organize prize competitions that address aeronautics challenges in which participants will compete for awards based on the competition rules. Competitions will promote creative solutions and harness innovation from citizen inventors, academics, and entrepreneurial firms. The competition designs will flow from the overall ARMD strategic objectives so that results and breakthroughs achieved during the competitions will address gaps in current aeronautical solutions.

### OPERATIONS

The NARI will be a “virtual institute” comprised of distributed multi-institutional, multi-disciplinary research teams that address a broad-range of major aeronautics research questions. ARMD provides policy guidance for the institute, including review and approval of implementation plans; review and concurrence for interagency agreements; and compliance with agency requirements. NASA’s Ames Research Center provides staff and infrastructure for the institute. NARI shares the virtual collaboration infrastructure with two existing NASA virtual institutes at Ames but tailors these resources to the needs of the aeronautics research community. The institute will ensure dissemination of NARI-related aeronautical findings via the Internet and through Web-based seminars.

Unlike the other two virtual institutes at Ames, NARI has no formal programs or internships for students. However, students have opportunities to propose or be team members of proposals in response to NARI solicitations.

### BUDGET

NARI has a \$10 million Fiscal Year (FY) 2012 budget that comes from the Innovative Concepts for Aviation (ICA) Project in the Aeronautics Strategy and Management (ASM) Program. Ames Research Center has been managing ICA Project funds since FY 2011. NARI will make similar sized investments in the NASA-internal Seedling and NASA-external LEARN solicitations in FY 2012. The prize money for future prize competitions will come either from NARI or other sources.

### We’re Working on...

Developing early-stage processes, concepts or technologies that have the potential to meet national aeronautics needs

Maturing research that is not currently supported by ARMD programs and projects

Infusing ARMD projects with NARI-supported research

For more information about the NASA Aeronautics Research Institute and NASA aeronautics research, visit **[www.aeronautics.nasa.gov](http://www.aeronautics.nasa.gov)**.

National Aeronautics and Space Administration

#### Headquarters

300 E. Street, SW  
Washington, DC 20546

**[www.nasa.gov](http://www.nasa.gov)**

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